

## Discoglossidae Günther, 1858 (Amphibia, Anura): proposed conservation

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The family-group name *Discoglossidae* Günther, 1858 is shown to be a junior synonym of four other names: *Bombinatoria* Gray, 1825; *Alytae* Fitzinger, 1843; *Bombitatores* Fitzinger, 1843; and *Colodactyli* Tschudi, 1845. The Article 40 of the Code allows to give the name *Discoglossidae* the date 1845 and priority over *Colodactyli*, but such an action cannot be taken as concerns the three other names. The ICZN is therefore requested to use its plenary powers to rule that the name *Discoglossidae* is to be given precedence over these three names whenever these names are considered to apply to a single taxon.

*Note* — This paper was submitted on 24 September 1982 to the Secretary of the International Commission on Zoological Nomenclature for publication in the *Bulletin of zoological Nomenclature*, but, despite repeated requests since then, has still not been published in this journal. The problem it raised has therefore remained unresolved, which is unfortunate, especially when one considers that, since then, several papers discussing the phylogeny, classification and nomenclature of the *Discoglossidae*, as well as books and checklists mentioning this and other family-group names, have been published (DUBOIS, 1983, 1984, 1985, 1987 a; MAXSON & SZYMURA, 1984; SANCHIZ, 1984; ALCOVER, SANDERS & SANCHIZ, 1984; FROST, 1985; DUELLMAN & TRUEB, 1986; LAURENT, 1986), and others are in progress. On 6 May 1986, the editor of the *Bulletin of zoological Nomenclature* at last proposed me to publish this paper, but in a drastically reduced version, excluding in particular the list of references, which would simply have been mentioned as being "held by the Secretariat". Unfortunately, a list of references held by a Secretariat cannot compare with a published list of references, which is immediately available to the whole scientific community, and will remain so in the future. The paper is therefore published here as it was submitted, except that a few more recent bibliographic references and information have been incorporated.

(1) The family-group name *Discoglossidae* was coined by GÜNTHER (1858 : 346 ; 1859) for a family including six nominal genera of Amphibia Anura (*Chiroleptes*, *Pelodytes*, *Discoglossus*, *Leptobrachium*, *Megalophrys* and *Ceratophryne*).

In the same works, GÜNTHER (1858, 1859) also recognized a family *Bombinatoridae*, with four genera (*Pelobates*, *Bombinator*, *Alsodes* and *Telmatobus*), and a family *Alytidae*, with three genera (*Alytes*, *Scaphiopus* and *Heleioporus*).

(2) COPE (1864, 1865) proposed a new classification of the Anura, in which he grouped in a single family the genera *Latonia*, *Discoglossus*, *Alytes*, *Bombinator* and later (1866) *Zaphrissa*. For this family he chose to use the name *Discoglossidae*.

In making this choice, COPE (1864) would have taken a "first reviser action" if the three family-group names mentioned above had been created in the same paper by GÜNTHER (1858). Unfortunately, this is not the case.

Indeed, at the time when COPE took this action, his choice was particularly ill-founded. He should have used the name Bombinatoridae for this family: this name had the priority, having been coined, under the spelling Bombinatorina, by GRAY (1825); furthermore this name had been used regularly by zoologists since its creation and remained in use at least until 1885 (see references in Appendix).

The second and third family-group names available for the family were those of Alytae and of Bombitatores, both coined by FITZINGER (1843: 32). The first one, based on the generic name *Alytes* Wagler, 1829, had been used by several authors since its creation (see Appendix). The second one, based on the generic name *Bombinator* Wagler, 1830, an unjustified emendation and hence substitute name for *Bombinator* Merrem, 1820 (see DUBOIS, 1984), had been used only once, and by its author (FITZINGER, 1860: 415) after its creation. No first reviser action having ever been taken concerning the relative priority of the names Alytae and Bombitatores, I hereby select Alytae and consider it to have priority over Bombitatores.

The fourth available name for this group is Colodactyli, coined by TSCHUDI (1845) on the basis of the generic name *Colodactylus* Tschudi, 1845, a junior subjective synonym of *Discoglossus* Otth, 1837 (see DUBOIS, 1987: 11).

The name Discoglossidae was only the fifth to have been coined, and had been used only by GÜNTHER (1858, 1859) when COPE's (1864) work was published.

(3) Although COPE's choice was not justified at the time when he made it, it was followed by most subsequent authors. This was the case in particular of BOULENGER (1882: 444), who recognized a family Discoglossidae, including the genera *Discoglossus*, *Bombinator*, *Liopelma* and *Alytes*. Since then the name Discoglossidae has been almost universally used by zoologists (see Appendix) and is now considered the valid name of a family including several fossil genera and four living genera of Anura: *Alytes* Wagler, 1829; *Barbourula* Taylor & Noble, 1924; *Bombina* Oken, 1816 (Name Number 1064 on the *Official List of Generic Names in Zoology*) (a name of which *Bombinator* Merrem, 1820, and *Bombinator* Wagler, 1830, a substitute name for the latter, are junior subjective synonyms); and *Discoglossus* Otth, 1837 (a name of which *Colodactylus* Tschudi, 1845 is a junior subjective synonym).

Furthermore, this name has also been used, under the spelling Discoglossoidae, for a superfamily including the Discoglossidae and the Leiopelmatidae, by several recent authors (DUELLMAN, 1975; DOWLING & DUELLMAN, 1978; CEI, 1980; LAURENT, 1980, 1986; DUBOIS, 1983, 1984, 1985; MAXSON & SZYMURA, 1984).

(4) In view of the almost universal use of the name Discoglossidae since 1882, conservation of this name and rejection of the names Bombinatoridae, Alytidae, Bombitatores and Colodactylidae is to be commanded.

As concerns the last of these four names, this action may be taken easily and by a simple recourse to Article 40 of the *Code* ANONYMOUS, 1985: the generic name *Colodactylus* having been rejected as a junior synonym of *Discoglossus*, the family-group name Colodactyli having been replaced by Discoglossidae before 1961, and the replacement having won general ac-

ceptance, this replacement is to be maintained. The name *Discoglossidae* retains its own author (GÜNTHER) but takes the precedence of *Colodactyl* of which it is to be deemed the senior synonym : it must therefore be now written *Discoglossidae* Gunther, 1858 (1845) (see DUBOIS, 1987 a).

As concerns the three other names (*Bombinatoridae*, *Alytidae* and *Bombinatoridae*) however, simple recourse to the *Code* does not allow to reject them, and appeal must be made to the ICZN to solve the problem. Two different actions could be contemplated to achieve this aim :

- the first one would be the suppression under the plenary powers of the names *Bombinatorina* Gray, 1825, *Alytae* Fitzinger, 1843 and of all other family-group names based on the generic names *Bombinator*, *Alytes* and *Bombinator* proposed before 1858 (see Appendix);
- the second one would be a Ruling under the plenary powers stating that the name *Discoglossidae* Gunther, 1858 (1845) should be given precedence over the name(s) *Bombinatorina* Gray, 1825, *Alytae* Fitzinger, 1843 and/or *Bombitatores* Fitzinger, 1843 by any zoologist who considers that the genera *Discoglossus* and *Bombina* and/or *Alytes* belong to the same family-group.

The second action is here advocated because it is more economical and also for additional reasons which will now be discussed.

(5) Recently, LANZA, CEI & CRESPO (1975, 1976) presented evidence for a rather large immunological distance between the genus *Discoglossus* on one side and the genera *Alytes* and *Bombina* on the other, and suggested that both groups could be considered as two distinct families.

For the new family which they proposed to recognize, LANZA, CEI & CRESPO (1975, 1976) used the name *Bombinidae*, which they credited to FITZINGER (1826). In fact, the name used by FITZINGER (1826) was *Bombinatoroidea*, a junior synonym of *Bombinatorina* Gray, 1825. This family-group name is based on the generic name *Bombinator* Merrem, 1820, which is a junior subjective synonym of *Bombina* Oken, 1816 and has therefore a separate status in nomenclature. The name *Bombinatorina* (or *Bombinatoroidea*) may therefore be emended into *Bombinatoridae* or *Bombinatorinae*, but not into *Bombinidae* or *Bombininae*.

The first family-group name based on the generic name *Bombina* Oken, 1816 is *Bombininae* Fejérváry, 1921. The existence of this name seems to have been ignored by most authors after its creation. Thus MERTENS (1955 : 132), in his application for the conservation of the generic name *Bombina*, wrote : "The genus *Bombina* Oken, 1816, is not the type genus of a taxon belonging to any family-group". After its creation, the name *Bombininae* (under this spelling or under the emendation *Bombinidae*) has been used by TATARINOV (1964), KUHN (1965, 1967) and LANZA, CEI & CRESPO (1975, 1976). I have been unable to trace other uses of this name.

(6) Subsequent authors did not follow LANZA, CEI & CRESPO's (1975, 1976) proposal to recognize two families instead of one, but some authors proposed to divide the family *Discoglossidae* in two subgroups.

When this application was submitted to the ICZN (24 September 1982), this use of subfamilial suprageneric groups had not started. Since then, while some authors (e.g. OLMO et al., 1982 ; MAXSON & SZYMURA, 1984 ; FROST, 1985 ; DUELLMAN & TRUEB, 1986 ; LAU-

RENT, 1986) maintained all the genera of this group in a single undivided family, other authors proposed to divide the family in two subgroups. These subgroups were given the rank of "generic groups" ("*Discoglossus* group" and "*Bombina* group": ESTES & SANCHIZ, 1982 a, 1982 b), of tribes (Discoglossini and Alytini : SANCHIZ, 1984 ; ALCOVER, SANDERS & SANCHIZ, 1984) or of subfamilies (Discoglossinae and Bombinatorinae : DUBOIS, 1983, 1984, 1985, 1987 a).

Since it is likely that this use of subfamilial suprageneric groups in the Discoglossidae will be continued, it is important and urgent to stabilize the nomenclature of these groups and to solve the problems detailed above.

(7) If the family Discoglossidae is to be divided in two subfamilies, which name should be given to the non-nominotypical one?

In view of the recency of the name Bombinatorinae and of its very scarce use since its creation (which is far from being a "general acceptance", in the sense e.g. of Art. 40), conservation of this name in place of its senior subjective synonym Bombinatorina is not justified, all the more that this latter name has had a period of rather large use in the nineteenth century (see Appendix). Furthermore, if the name Bombinatorina was to be suppressed, the second name available for a family-group including *Alytes* and *Bombina* would be *Alytae* Fitzinger, 1843, a name which has priority over Bombinatorinae Fejérváry, 1921 and which has been used more in the past than this latter name (see Appendix). Finally, a third senior synonym of Bombinatorinae is Bombitatorinae Fitzinger, 1843, so that conservation of the name Bombinatorinae would request the suppression of three family-group names by the Commission.

The simplest and best action appears to be the conservation of the name Bombinatorina. This name has priority on the other ones, and was used more, and longer, than them, in the XIX century (see Appendix). The fact that this family-group name is based on a genus-group name which is now considered a junior synonym of another name is not a valid reason for rejecting this name, if one admits that family-group names of taxa are to be regulated by the *Code* (Art. 1 of the *Code*, ANONYMOUS, 1985) and in particular by its Principle of Priority (Art. 23 of the *Code*) (for a more detailed discussion of this question, see DUBOIS, 1987 b).

The simplest action which can be suggested for solving all the problems discussed above is therefore to provide for the priority of the name Discoglossidae over the name Bombinatorina, but without suppressing any name. The authors who believe that only one family-group taxon should be recognized for all these genera will therefore keep using the name Discoglossidae for this taxon, while those who think that *Alytes*, *Bombina* and *Barbourula* should be separated from *Discoglossus* at the subfamilial or familial level can use the name Bombinatorinae in this respect. Finally, for those who may think that even more splitting is necessary, they could have for example a family Discoglossidae Gunther, 1858 (1845) with two subfamilies, Discoglossinae Gunther, 1858 (1845) and Bombinatorinae Gray, 1825, the latter with two tribes, Bombinatorini Gray, 1825 and Alytini Fitzinger, 1843 (see DUBOIS, 1987 a : 11-12).

(8) Accordingly I ask the International Commission on Zoological Nomenclature

(1) to use its plenary powers to rule that the family-group name Discoglossidae Gunther, 1858 (1845) is to be given precedence over the name(s) Bombinatorina Gray, 1825, *Alytae* Fitzinger, 1843 and/or Bombitatorinae Fitzinger, 1843 by any zoologist who considers

that the genera *Discoglossus* Otth, 1837 and *Bombina* Oken, 1816 and/or *Alytes* Wagler, 1829 belong to the same family-group;

(2) to place the following family-group names on the *Official List of Family-Group Names in Zoology*:

(a) *Discoglossidae* Gunther, 1858 (1845) (type genus *Discoglossus* Otth, 1837), with an endorsement that it is to be given nomenclatural precedence over *Bombinatorina* Gray, 1825, *Alytae* Fitzinger, 1843 and/or *Bombitatores* Fitzinger, 1843 whenever these names are considered synonyms;

(b) *Bombinatorina* Gray, 1825 (type genus *Bombinator* Merrem, 1820, a junior subjective synonym of *Bombina* Oken, 1816, Name Number 1064 on the *Official List of Generic Names in Zoology*), with an endorsement that it is not to be given priority over *Discoglossidae* Gunther, 1858 (1845) whenever the two names are considered synonyms;

(c) *Alytae* Fitzinger, 1843 (type genus *Alytes* Wagler, 1829), with an endorsement that it is not to be given priority over *Discoglossidae* Gunther, 1858 (1845) whenever the two names are considered synonyms;

(d) *Bombitatores* Fitzinger, 1843 (type genus *Bombinator* Wagler, 1830, a substitute name for *Bombinator* Merrem, 1820), with an endorsement that it is not to be given priority over *Discoglossidae* Gunther, 1858 (1845) whenever the two names are considered synonyms;

(3) to place the following generic names on the *Official List of Generic Names in Zoology*:

(a) *Discoglossus* Otth, 1837 (gender : masculine) (type species, by monotypy, *Discoglossus pictus* Otth, 1837);

(b) *Bombinator* Merrem, 1820 (gender : masculine) (type species, by subsequent designation of DUMÉRIL & BIBRON (1841 : 485), *Bufo igneus* Laurenti, 1768, a junior subjective synonym of *Rana bombina* Linnaeus, 1761, Name Number 1141 on the *Official List of Specific Names in Zoology*);

(c) *Alytes* Wagler, 1829 (gender : masculine) (type species, by monotypy, *Bufo obstetricans* Laurenti, 1768);

(d) *Bombinator* Wagler, 1830, a substitute name for *Bombinator* Merrem, 1820;

(4) to place the following specific names on the *Official List of Specific Names in Zoology*:

(a) *pictus* Otth, 1837, as published in the binomen *Discoglossus pictus* (specific name of type species of *Discoglossus* Otth, 1837);

(b) *igneus* Laurenti, 1768, as published in the binomen *Bufo igneus* (specific name of type species of *Bombinator* Merrem, 1820 and of *Bombinator* Wagler, 1830);

(c) *obstetricans* Laurenti, 1768, as published in the binomen *Bufo obstetricans* (specific name of type species of *Alytes* Wagler, 1829).

## RÉSUMÉ

Le nom *Discoglossidae* Gunther, 1858 s'avère un synonyme plus récent de quatre autres noms du groupe-famille : *Bombinatorina* Gray, 1825 ; *Alytae* Fitzinger, 1843 ; *Bombitatores* Fitzinger, 1843 , et *Colodactyli* Tschudi, 1845. L'article 40 du *Code* permet d'attribuer au nom *Discoglossidae* la date de 1845 et de lui donner la priorité sur *Colodactyli*, mais une telle action ne peut être effectuée en ce qui concerne les trois autres noms. En conséquence, il est demandé à l'ICZN de faire usage de ses pleins pouvoirs pour décider que la priorité doit être donnée au nom *Discoglossidae* par rapport aux trois autres noms, lorsque ces noms sont considérés comme synonymes.

## APPENDIX

List of references of works using the family-group names *Bombinatorina* Gray, 1825, *Alytae* Fitzinger, 1843, *Bombitatores* Fitzinger, 1843, *Colodactyli* Tschudi, 1845, *Discoglossidae* Gunther, 1858 and *Bombinatorinae* Fejérváry, 1921.

Family-group original name, author and date (name of type genus)	Spelling used	References
<i>Bombinatorina</i> Gray, 1825 ( <i>Bombinator</i> Merrem, 1820)	<i>Bombinatorina</i>	GRAY, 1825 : 214 BONAPARTE, 1850 BONAPARTE, 1852 : 477 GÜNTHER, 1858 : 344 GÜNTHER, 1859 : viii, 40 MIVART, 1869 : 290
	<i>Bombinatoroidea</i>	FITZINGER, 1826 : 37
	<i>Bombinatoridae</i>	GRAY, 1831 : 38 BONAPARTE, 1850 BONAPARTE, 1852 : 477 GÜNTHER, 1858 : 343 GÜNTHER, 1859 : viii, 40 STEINDACHNER, 1867 : 33 MIVART, 1869 : 286 FATIO, 1872 : 230 HOFFMANN, 1878 : 633 MÜLLER, 1878 : 582
	<i>Bombitatores</i>	TSCHUDI, 1838 : 26 TSCHUDI, 1845 : 170
	<i>Bombinatorida</i>	BAYER, 1885 : 22
	<i>Bombinatorinae</i>	DUBOIS, 1983 : 271 DUBOIS, 1984 : 26 DUBOIS, 1985 : 74 DUBOIS, 1987 a : 12
	<i>Bombinatorini</i>	DUBOIS, 1987 a : 12

Family-group original name, author and date (name of type genus)	Spelling used	References
Alytae Fitzinger, 1843 ( <i>Alytes</i> Wagler, 1829)	Alytae	FITZINGER, 1843 : 32 TSCHUDI, 1845 : 168 FITZINGER, 1860 : 415
	Alyuna	BONAPARTE, 1850 BONAPARTE, 1852 : 477 MIVART, 1869 : 291
	Alytidae	GÜNTHER, 1858 : 346 GÜNTHER, 1859 : viii, 37 COPE, 1863 : 51 STEINDACHNER, 1867 : 32 KEFERSTEIN, 1868 : 269 MIVART, 1869 : 286 FATIO, 1872 : 230 HOFFMANN, 1878 : 631 LATASTE, 1878 : 491 MÜLLER, 1878 : 582 LATASTE, 1879 : 761 FROST, 1985 : 105
	Alytini	SANCHIZ, 1984 : 61 ALCOVER, SANDERS & SANCHIZ, 1984 : 109 DUBOIS, 1987 a : 12
	Alytinae	DUBOIS, 1987 a : 12
Bombitatores Fitzinger, 1843 ( <i>Bombinator</i> Wagler, 1830)	Bombitatores	FITZINGER, 1843 : 32 FITZINGER, 1860 : 415
Colodactyli Tschudi, 1845 ( <i>Colodactylus</i> Tschudi, 1845)	Colodactyli	TSCHUDI, 1845 : 167 DUBOIS, 1987 a : 11
	Colodactylidae	DUBOIS, 1987 a : 11
Discoglossidae Gunther, 1858 ( <i>Discoglossus</i> Otth, 1837)	Discoglossidae	GÜNTHER, 1858 : 346 GÜNTHER, 1859 : viii, 34 COPE, 1864 : 183 COPE, 1865 : 105 COPE, 1866 : 74 STEINDACHNER, 1867 : 28 KEFERSTEIN, 1868 : 267 THEOBALD, 1868 : 82 MIVART, 1869 : 287 FATIO, 1872 : 230 COPE, 1875 : 10 HOFFMANN, 1878 : 627 LATASTE, 1878 : 491 MÜLLER, 1878 : 582 LATASTE, 1879 : 761 BOULENGER, 1882 : 444 CAMERANO, 1884 : 203

Family-group original name, author and date (name of type genus)	Spelling used	References
		COPE, 1889 a : 248
		COPE, 1889 b : 862
		BOULFNGER, 1897 : 123
		GADOW, 1901 : 152
		STEJNEGER, 1907 : 50
		BOULFNGER, 1910 : 149
		SCHREIBER, 1912 : 159
		VAN DENBURGH, 1912 : 259
		NICHOLLS, 1916 : 81
		BOLKAY, 1919 : 349
		FEJÉRVÁRY, 1921 : 25
		NOBLE, 1922 : 22
		NIEDEN, 1923 : 24
		MIRANDA-RIBEIRO, 1924 : 143
		TAYLOR & NOBLE, 1924 : 1
		STEJNEGER, 1925 : 6
		NOBLE, 1927 : 69
		SCHMIDT, 1927 : 556
		MERTENS & MÜLLER, 1928 : 15
		NOBLE, 1931 : 486
		POPE, 1931 : 434
		LIU, 1935 : 22
		MERTENS & MÜLLER, 1940 : 14
		POPE & BORING, 1940 : 24
		BOURRET, 1942 : 153
		INGFR, 1954 : 209
		REIG, 1958 : 115
		PASTEUR & BONS, 1959 : 100
		FÜHN, 1960 : 164
		MERTENS & WFRMUTH, 1960 : 37
		LIU & HU, 1961 : 35
		GOIN & GOIN, 1962 : 223
		GRIFFITHS, 1963 : 271
		TIHEN, 1965 : 315
		GORHAM, 1966 : 9
		OKADA, 1966 : 1
		INGFR, 1967 : 371
		KAWAMURA, NISHIOKA & UFDA, 1972 : 303
		ESTES & REIG, 1973 : 17
		LYNCH, 1973 : 134
		SAVAGE, 1973 : 354
		STARRFTT, 1973 : 251
		TRUEB, 1973 : 70
		GORHAM, 1974 : 41
		DUFFILMAN, 1975 : 5
		LANZA, CEI & CRESPO, 1975 : 158
		LANZA, CEI & CRESPO, 1976 : 311
		SOKOL, 1977 : 505
		DOWLING & DUELLMAN, 1978 : 21.1
		GOIN, GOIN & ZUG, 1978 : 231
		ISKANDAR, 1978 : 564
		SANLHIZ & ADROVER, 1979 : 6



Family-group original name, author and date (name of type genus)	Spelling used	References
		LAURENT, 1980 : 399 ESTES & SANCHIZ, 1982 a : 9 ESTES & SANCHIZ, 1982 b : 33 OLMO et al , 1982 : 283 DUBOIS, 1983 : 271 DUBOIS, 1984 : 24 MAXSON & SZYMURA, 1984 : 245 VIETEL, 1984 : 21 SANCHIZ, 1984 : 61 ALCOVER, SANDERS & SANCHIZ, 1984 : 109 DUBOIS, 1985 : 74 FROST, 1985 : 105 DUELLMAN & TRUEB, 1986 : 518 LAURENT, 1986 : 661 DUBOIS, 1987 a : 11
	Discoglossina	MIVART, 1869 : 294
	Discoglossinae	FEJÉRVÁRY, 1921 : 25 DUBOIS, 1983 : 271 DUBOIS, 1984 : 26 DUBOIS, 1985 : 74 DUBOIS, 1987 a : 12
	Discoglossoidae	DUELLMAN, 1975 : 5 DOWLING & DUELLMAN, 1978 : 19.1 CEI, 1980 : 11 LAURENT, 1980 : 398 DUBOIS, 1983 : 271 DUBOIS, 1984 : 24 MAXSON & SZYMURA, 1984 : 245 DUBOIS, 1985 : 74 LAURENT, 1986 : 658
Bombininae Fejérváry, 1921 ( <i>Bombina</i> Oken, 1816)	Bombininae	FEJÉRVÁRY, 1921 : 25 KUHN, 1967 : 16
	Bombinidae	TATARINOV, 1964 : 128 KUHN, 1965 : 89 KUHN, 1967 : 16 LANZA, CEI & CRESPO, 1975 : 158 LANZA, CEI & CRESPO, 1976 : 311

## LITERATURE CITED

- ALCOVER, J. A., SANDERS, E. & SANCHIZ, B., 1984. - El registro fósil de los sapos parteros (Anura, Discoglossidae) de Baleares. *In* : HEMMER & ALCOVER (1984) : 109-121
- BAYER, F., 1885. - O kostře žab z čeledi pelobatid. *Abh. boh. Ges. Wiss.*, (6., 12 (13) : 1-24, pl. 1-2.

- BOLKAY, S. J., 1919. – Osnove Uporedne Osteologije Anurskih Batrahija. *Glasn zemalj. Mus. Bosni Herceg.*, **31** : 275-357.
- BONAPARTE, C. L., 1850. – *Conspectus systematum Herpetologiae et Amphibiologiae*. Editio altera reformata. Lugduni Batavorum, Brill : 1 pl.
- 1852. – *Conspectus systematum Herpetologiae et Amphibiologiae*. *Nuovi Ann. Sci. nat. Bologna*, (3), **5** : 477 - 480.
- BOULENGER, G. A., 1882. – *Catalogue of the Batrachia Sahlentia s. Ecaudata in the collection of the British Museum*. London, Taylor & Francis : i-xvi + 1-503, pl. I-XXX.
- 1897. – *The Tailless Batrachians of Europe*. Part I London, Ray Society : i-iii + 1-210, pl. I-X, 2 maps.
- 1910. – *Les Batraciens, et principalement ceux d'Europe*. Paris, Doin : i-iii + 1-305.
- BOURRET, R., 1942. – *Les Batraciens de l'Indochine*. Hanoi, Institut océanographique de l'Indochine : i-x + 1-547, 4 pl.
- CAMERANO, L., 1884. – Monografia degli Anfibi Anuri italiani. *Mem. real Accad. Sci. Torino*, (2), **35** : 187-284, pl. I-II.
- CEI, J. M., 1980. – Amphibians of Argentina. *Monit. zool. ital.*, (n.s.), monogr. 2: i-xii + 1-609, pl. 1-16 + 1-24.
- COPE, E. D., 1863. – On *Trachycephalus*, *Scaphiopus* and other American Batrachia. *Proc. Acad. nat. Sci. Phila.*, **1863** : 43-54.
- 1864. – On the limits and relations of the Raniformes. *Proc. Acad. nat. Sci. Phila.*, **1864** : 181-183.
- 1865. – Sketch of the primary groups of Batrachia Salientia. *Nat. Hist. Rev.*, (n.s.), **5** : 97-120
- 1866. – On the structures and distribution of the genera of the Arciforous Anura. *J. Acad. nat. Sci. Phila.*, (2), **6** : 67-112
- 1875. – Check-list of North American Batrachia and Reptilia. *Bull. U. S. nat. Mus.*, **1** : 1-104.
- 1889 a. – The Batrachia of North America. *Bull. U. S. nat. Mus.*, **34** : 1-525, pl. I-LXXXVI.
- 1889 b. – Synopsis of the families of Vertebrata. *Am. Nat.*, **23** : 849-877.
- DOWLING, H. G. & DUELLMAN, W. E., 1978. – Systematic herpetology : a synopsis of families and higher categories. *Publications in Herpetology*, Hiss Publications, New York, **7** : i-vii + 1.1-118.3 + i-viii.
- DUBOIS, A., 1983. – Classification et nomenclature supragénérique des Amphibiens Anoures. *Bull. Soc. linn. Lyon*, **52** : 270-276.
- 1984. – La nomenclature supragénérique des Amphibiens Anoures. *Mem. Mus. nat. Hist. nat.*, (A), **131** : 1-64.
- 1985. – Miscellanea nomenclatorica batrachologica (VII). *Alytes*, **4** : 61-78
- 1987 a. – Miscellanea taxinomica batrachologica (I). *Alytes*, **5** : 7-95.
- 1987 b. – Again on the nomenclature of frogs. *Alytes*, **6** : 27-55.
- DUELLMAN, W. E., 1975. – On the classification of frogs. *Occ. Pap. Mus. nat. Hist. Univ. Kansas*, **42** : 1-14.
- DUELLMAN, W. E. & TRUEB, L., 1986. – *Biology of Amphibians*. New York, McGraw-Hill : i-xix + 1-670
- DUMÉRIL, A.-M.-C. & BIBRON, G., 1841. – *Erpetologie générale ou histoire naturelle complète des Reptiles*. Tome 8. Paris, Roret : i-vii + 1-792.
- ESTES, R. & REIG, O. A., 1973. – The early fossil record of frogs : a review of the evidence. In: VIAL (1973) : 11-63
- ESTES, R. & SANCHIZ, B., 1982 a. – New discoglossid and palaeobatrachid frogs from the late Cretaceous of Wyoming and Montana, and a review of other frogs from the Lance and Hell Creek formations. *J. Vert. Paleont.*, **2** : 9-20.
- 1982b. – Early Cretaceous vertebrates from Galve (Teruel), Spain. *J. Vert. Paleont.*, **2** : 21-39.
- FATIO, V., 1872. – *Faune des Vertébrés de la Suisse*. Genève & Bâle, Georg. : 1-603 + i-xii, pl. I-V
- FEJÉRVÁRY, G. J. V., 1921. – Kritische Bemerkungen zur Osteologie, Phylogenie und Systematik der Anuren. *Arch. Naturgesch.*, **87** (3) : 1-30
- FITZINGER, L. I., 1826. – *Neue Classification der Reptilien*. Wien, Heubner : i-viii + 1-66, 1 tab.
- 1843. – *Systema Reptilium*. Fasciculus primus. *Amblyglossae*. Vindobonae, Braumuller & Seidel : 1-106 + i-ix.

- 1860. - Die Ausbeute der österreichischen Naturforscher an Säugethieren und Reptilien während der Weltumsegelung Sr. Majestät Fregatte Novara. *Sber. Akad. Wiss Wien*, **42** : 383-416
- FROST, D. R. (ed.), 1985. - *Amphibian species of the world* Lawrence, Allen Press & Assoc. Syst. Coll.: [i-iv] + i-v + 1-732.
- FUHN, I. E., 1960 - *Amphibia Fauna Republici Populare Romine*, Bucuresti, Academiei Republicii Populare Romine, **14** (1) : 1-288.
- GADOW, H., 1901. - *Amphibia and Reptiles*. London, Macmillan & Co : i-xii + 1-668, 1 pl.
- GOIN, C. J. & GOIN, O. B., 1962. *Introduction to herpetology*. San Francisco & London, Freeman & Co : i-ix + 1-341.
- GOIN, C. J., GOIN, O. B. & ZUG, G. R., 1978 - *Introduction to herpetology*. Third edition. San Francisco, Freeman & Co. : i-xiii + 1-378.
- GORHAM, S. W., 1966. - Liste der rezenten Amphibien und Reptilien. Ascaphidae, Leiopelmatidea (sic), Pipidae, Discoglossidae, Pelobatidae, Leptodactylidae, Rhinophrynidae. *Das Tierreich*, **85** : i-xvi + 1-222.
- 1974 - *Checklist of world Amphibians up to January 1, 1970* Saint John, The New Brunswick Museum : 1-173.
- GRAY, J. E., 1825 - A synopsis of the genera of Reptiles and Amphibia, with a description of some new species. *Ann. Philos.*, (2), **10** : 193-217.
- 1831. - Description of two new genera of frogs discovered by John Reeves, Esq. in China. In : *The zoological Miscellany*, London, Treuttel, Wurz & Co., 1-40 : 38.
- GRIFFITHS, I., 1963. - The phylogeny of the Salientia. *Biol. Rev.*, **38** : 241-292.
- GUNTHER, A., 1858. - On the systematic arrangement of the Tailless Batrachians and the structure of *Rhinophrynus dorsalis*. *Proc. zool. Soc. Lond.*, **1858** : 339-352.
- 1859 - *Catalogue of the Batrachia Salientia in the collection of the British Museum*. London, Taylor & Francis : i-xvi + 1-160, pl. I-XII.
- HEMMER, H. & ALCOVER, J. A. (eds.), 1984. - Història biològica del ferretet. Ciutat de Mallorca, Moll : 1-252.
- HOFFMANN, C. K., 1878. - Klassen und Ordnungen der Amphibien wissenschaftlich dargestellt in Wort und Bild. In: BRONN, H. G., *Die Klassen und Ordnungen des Thier-Reichs wissenschaftlich dargestellt in Wort und Bild*, Leipzig & Heidelberg, Winter, **6** (2) : 1-726, pl. I-LII
- INGER, R. F., 1954. - Systematics and zoogeography of Philippine Amphibia. *Fieldiana. Zool.*, **33** : 183-531.
- 1967. - The development of a phylogeny of frogs. *Evolution*, **21** : 369-384.
- ISKANDAR, D. J., 1978. - A new species of *Barbourula*: first record of a discoglossid Anuran in Borneo. *Copeia*, **1978** : 564-566.
- KAWAMURA, T., NISHIOKA, M. & UEDA, H., 1972 - Reproduction of the oriental fire-bellied toad, *Bombina orientalis*, with special reference to the superiority of this species as a laboratory animal. *Sci. Report Lab. Amph. Hiroshima Univ.*, **1** : 303-317
- KEFERSTEIN, W., 1868. - Ueber die Batrachier Australiens. *Arch. Naturgesch.*, **34** (1) : 253-290, pl. V-VIII.
- KÜHN, O., 1965 - *Die Amphibien. System und Stammesgeschichte* Krailling bei München, Oeben : 1-102.
- 1967. - *Amphibien und Reptilien*. Stuttgart, Gustav Fischer : i-vii + 1-124.
- LANZA, B., CEI, J. M. & CRESPO, E., 1975 - Immunological evidence for the specific status of *Discoglossus pictus* Oth., 1837 and *D. sardus* Tschudi, 1837, with notes on the families Discoglossidae Günther, 1858 and Bombinidae Fitzinger, 1826 (Amphibia Salientia). *Monit. zool. ital.*, (n.s.), **9** : 153-162.
- 1976 - Further immunological evidence for the validity of the family Bombinidae (Amphibia Salientia). *Monit. zool. ital.*, (n.s.), **10** : 311-314.
- LATASTE, F., 1878 - Division en familles naturelles des Batraciens Anoures d'Europe. *Rev. int. Sci.*, **2** : 488-499.
- 1879. - Division en familles naturelles des Batraciens Anoures d'Europe. *C. r. Assoc. fr. Av. Sci.*, **7** : 758-765.
- LAURENT, R. F., 1980. - Esquisse d'une phylogenèse des Anoures. *Bull. Soc. zool. France*, **104** : 397-422
- 1986. - Sous-classe des Lissamphibiens (Lissamphibia). Systematique. In : P.-P. GRASSÉ & M.

- DELSOL (eds.), *Traite de zoologie*, Tome XIV, *Batraciens*, Fasc. I-B, Paris, Masson : 594-797.
- LAURENTI, J. N., 1768. - *Specimen medicum, exhibens Synopsin Reptilium emendatam cum experimentis circa venena et antidota reptilium austriacorum* Viennae, Joan. Thom. Nob. de Trattner: 1-ii + 1-215, pl. I-V.
- LINNAEUS, C., 1761 - *Fauna Svecica*. Editio altera, auctior. Stockholmiae, Laurentii Salvii. 1-xlix + 1-579, pl. I-II
- LIU, C. C., 1935. - Types of vocal sac in the Salientia *Proc Boston Soc. nat Hist*, 41 (3) : 19-40, pl. 4-8.
- LIU, C.-C. & HU, S.-C., 1961. - *The Tailless Amphibians of China* (In Chinese). Shanghai : 1-xvi + 1-364, pl. I-VI + I-XXVIII
- LYNCH, J. D., 1973. - The transition from archaic to advanced frogs. In: VIAL (1973) : 133-182.
- MAXSON, L. R. & SZYMURA, J. M., 1984 - Relationships among discoglossid frogs : an albumin per spective. *Amphibia-Reptilia*, 5 : 245-252.
- MERREM, B., 1820 - *Versuch eines Systems der Amphibien* Marburg, Johann Christian Krieger. 1-188 (x 2) + 189-191, 1 pl.
- MERTENS, R., 1955. - Proposed use of the plenary powers to conserve the generic name *Bombina* Oken, 1816 (class Amphibia, order Anura). *Bull. zool. Nomencl*, 11 : 132-133.
- MERTENS, R. & MÜLLER, L., 1928. - Liste der Amphibien und Reptilien Europas. *Abh. senckenberg naturf. Ges.*, 41 : 1-62
- 1940. Die Amphibien und Reptilien Europas (Zweite Liste, nach dem Stand vom 1. Januar 1940). *Abh. senckenberg naturf. Ges.*, 451 : 1-56.
- MERTENS, R. & WERMUTH, H., 1960. *Die Amphibien und Reptilien Europas*. (Dritte Liste, nach dem Stand vom 1. Januar 1960). Frankfurt am Main, Waldemar Kramer : 1-xi + 1-264
- MIRANDA RIBEIRO, A. DE, 1924. - Notas batrachológicas. *Bol Mus nac Rio de Janeiro*, 1 : 137-143
- MIVART, G., 1869. - On the classification of the Anurous Batrachians. *Proc. zool Soc Lond*, 1869 : 280-295.
- MÜLLER, F., 1878. - Katalog der im Museum und Universitätskabinet zu Basel aufgestellten Amphibien und Reptilien nebst Anmerkungen *Verhandl. naturf. Ges Basel*, 6 : 559-709, pl. I-III.
- NICHOLLS, G. E., 1916. - The structure of the vertebral column in the Anura Phaneroglossa and its importance as a basis of classification. *Proc. Linn. Soc Lond*, 128 : 80-92.
- NIEDEN, F., 1923. - Amphibia Anura I. Subordo Aglossa und Phaneroglossa, sectio I Arcifera *Das Tierreich*, 46 : 1-584.
- NOBLE, G. K., 1922. - The phylogeny of the Salientia I The osteology and the thigh musculature ; their bearing on classification and phylogeny. *Bull. Am. Mus. nat. Hist*, 46 : 1-87, pl. I-XXIII, 1 tab.
- 1927. - The value of life history data in the study of the evolution of the Amphibia *Annals New York Acad. Sci.*, 30 : 31-128, pl. I-IX.
- 1931. - *The biology of the Amphibia*. New York, Dover : i-xviii + 1-577.
- OKADA, Y., 1966. - *Fauna Japonica Anura (Amphibia)*. Tokyo, Biogeographical Society of Japan : 1-xii + 1-234, pl. I-XXIV.
- OKEN, L. VON, 1816. - *Lehrbuch der Naturgeschichte* Dritter Theil, *Zoologie*, Zweite Abtheilung. Jena, August Schmid & Comp. : i-xvi + 1-1272.
- OLMO, E., MORESCALCHI, A., STINGO, V. & ODIERNA, G., 1982 - Genome characteristics and the systematics of the Discoglossidae (Amphibia Salientia) *Monit zool ital*, (n.s.), 16 : 283-299
- OTTH, A., 1837 - Beschreibung einer neuen Europäischen Froschgattung, *Discoglossus* N. *Denkschr Schweizer. Ges. Naturwiss.*, 1 (4) : 1-7, 1 pl.
- PASTEUR, G. & BONS, J., 1959. - Les Batraciens du Maroc. *Trav Inst sci cherif.*, (Zool.), 17 : i-xvi + 1-246, pl. I-III, maps 1-3.
- POPE, C. H., 1931. - Notes on Amphibians from Fukien, Hainan, and other parts of China *Bull Am Mus. nat. Hist.*, 61 : 397-611, pl. XIII-XXII.
- POPE, C. H. & BORING, A. M., 1940. A survey of Chinese Amphibia. *Peking nat Hist. Bull.*, 15 : 13-86, 1 map.
- REIG, O. A., 1958. - Proposiciones para una nueva macrosistemática de los Anuros. *Physis*, 21 : 109-118.
- SANCHEZ, B., 1984. - Análisis filogenético de la tribu Alytini (Anura, Discoglossidae) mediante el estudio de su morfoestructura ósea. In: HEMMER & ALCOVER (1984) : 61-108.

- SANCHIZ, F. B. & ADROVER, R., 1979 - Anfíbios fósiles del Pleistoceno de Mallorca. *Doñana, Acta vertebr.*, 4 : 5-25.
- SAVAGE, J. M., 1973. - The geographic distribution of frogs : patterns and predictions. In : VIAL (1973) : 351-445.
- SCHMIDT, K. P., 1927. - Notes on Chinese Amphibians. *Bull. Am Mus nat Hist*, 54 : 553-575, pl. XXXI-XXXII.
- SCHREIBER, E., 1912. - *Herpetologia Europaea*. Jena, Gustav Fischer. 1-x + 1-960.
- SOKOL, O. M., 1977. - A subordinal classification of frogs (Amphibia : Anura). *J. Zool., Lond.*, 182 : 505-508
- STARRETT, P. H., 1973. - Evolutionary patterns in larval morphology. In : VIAL (1973) : 251-271.
- STEINDACHNER, F., 1867. - *Reise der österreichischen Fregatte Novara um die Erde in den Jahren 1857, 1858, 1859 unter den Befehlen des Commodore B. von Wüllerstorff-Urbair*. Zoologischer Theil. Band I. *Amphibien*. Wien, aus der Kaiserlich-Königlichen Hof- und Staatsdruckerei : 1-70, pl. I-V
- STEFNEGER, L., 1907. - Herpetology of Japan and adjacent territory. *Bull. U S nat Mus.*, 58: 1-xx + 1-577, pl. I-XXXV.
- ..... 1925. - Chinese Amphibians and Reptiles in the United States National Museum. *Proc. U. S. nat. Mus.*, 66 (25) : 1-115.
- TATARINOV, L. P., 1964. - Nadotryad Salientia Prygayuşchie, ih Beskhvostye. In : Y. A. ORLOV (ed.), *Osnovy Paleontologii*, Tome 12, *Zemnovodnye, Presmykayuşchieya i Pticy*. Moskva, Izdatelbstvo "Nauka" : 125-133
- TAYLOR, E. H. & NOBLE, G. K., 1924. - A new genus of discoglossid frogs from the Philippine islands. *Am. Mus. Novit.*, 121 : 1-4
- THEOBALD, W., 1868. - Catalogue of Reptiles in the Museum of the Asiatic Society of Bengal. *J. asiat Soc. Bengal*, 1868 : i-iii + 1-88, 4 pl.
- TIHEN, J. A., 1965. - Evolutionary trends in frogs. *Am. Zool.*, 5 : 309-318
- TRUEB, L., 1973. - Bones, frogs, and evolution. In : VIAL (1973) : 65-132.
- TSCHUDI, J. J., 1838 - *Classification der Batrachier, mit Berücksichtigung der fossilen Thiere dieser Abtheilung der Reptilien*. Neuchâtel, Petitpierre : 1-102, pl. I-VI.
- ..... 1845. - Reptilium conspectus quae in Republica Peruana reperiuntur et pleraque observata vel collecta sunt in itinere. *Arch. Naturgesch.*, 11 : 150-170.
- VAN DENBURGH, J., 1912. - Notes on *Ascaphus*, the discoglossoid toad of North America. *Proc. Calif. Acad. Sci.*, (4), 3 : 259-264.
- VIAL, J. L. (ed.), 1973. - *Evolutionary biology of the Anurans*. Columbia, University of Missouri Press. 1-xii + 1-470.
- VIETTEL, B., 1984. - Habit, melanin pigmentation, oral disc, oral cavity and filter apparatus of the larvae of *Baleaphryne muletensis*. In : HEMMER & ALCOVER (1984) : 21-43.
- WAGLER, J., 1829. - Descriptiones et icones Amphibiorum. *Iss. von Oken*, 1829 : 68-70.
- ..... 1830 - *Natürliches System der Amphibien, mit vorangehender Classification der Säugethiere und Vogel*. München, Stuttgart & Tübingen, Cotta : i-vi + 1-354.